

THE ARNOLD ARBORETUM DURING THE FISCAL YEAR
ENDED JUNE 30, 1949

Horticulture. — The Arnold Arboretum plantings have been kept in good condition during the past year. Extensive pruning work has been done and weed trees and shrubs have been removed on the South Street bank in the juniper and yew collections. Commercial fertilizer was applied to the collections of magnolias, Japanese maples, elms, euonymus, sorbus, rhododendrons, and to the shrub collection. Mulching of trees and shrubs with hops has been continued, and has been very effective in promoting growth, suppressing weeds and preventing grass fires from killing shrubs and small trees. The control of grass growth by constant mowing with the "blitzer" has also reduced fire hazards and improved the appearance of the grounds. Various weed killers, Solvasol, Ammate, Esteron 44, and Dow 2-4-5 T have been used in an effort to eliminate poison ivy and shrubby weeds, and to control weeds in the cultivated areas.

Two of the major projects supported by funds from the Friends of the Arnold Arboretum are nearly completed. More than three hundred azaleas and other ericaceous shrubs have been planted in the new border along the Meadow Road. Several hundred ground cover plants were planted in adjacent areas.

The vine collection has been moved to the Arborway wall, and the unsightly trellis in the shrub collection has been removed. A new tree peony collection was planted near the Wisteria arbor, and includes thirty varieties not previously grown in the Arboretum.

The rehabilitation of the Peters Hill area, made possible by contributions from John Ames, is progressing satisfactorily. More than two thousand superfluous or decrepit trees have been removed, and the small shrubs and seedlings were sprayed with weed killers. A soil improvement program was started to insure an adequate sod cover which would prevent erosion and excessive invasion of weed trees. The hiring of heavy equipment for much of this work was necessary and the cost has been excessive. Other methods will be used on the alternate contour strips. We hope to establish a good grass cover and begin a planting program in 1950.

A number of surplus plants were given to Harvard University and Radcliffe College, and several truck loads of surplus nursery stock were given to the Massachusetts State Hospital for Crippled Children. More than 60 plants of new varieties originating in the Arnold Arboretum were distributed to cooperating nurserymen. Plants, and seeds of woody plants have been received from nurserymen and from botanic gardens.

The Case estates in Weston have been of great value in our nursery trials, testing plots, and for permanent nurseries of surplus stock. Various types of horticultural experiments are conducted here. About seven acres

are devoted to a forest tree test plot under the auspices of the Cabot Foundation. The Weston Garden Club did the major work in maintaining the perennial garden, and distributed the flowers to the Veterans' and the Waltham Hospitals. The Division of Landscape Architecture continues to use some of the Case land for demonstration work.

The bulletin of popular information, "Arnoldia" was continued as usual. A new Guide, "Through the Arnold Arboretum" was written, and five thousand copies were printed. Dr. Wyman's new book, "Shrubs and Vines for American Gardens" was published by the Macmillan Company in May 1949. The field class held in the fall attracted thirty-five members, while the spring class held on Saturday mornings drew about thirty students.

Several hundred apple and cherry hybrids have been grown and are now in test plots. Several of the new apple hybrids selected for further trial have been found to be apomictic and breed true from seed. New triploid forsythia hybrids appear to be very promising. Few of the rose hybrids have been of value. Work on dwarfing rootstocks is being continued.

Comparative Morphology. — Professor Bailey and his co-workers have continued their investigations of the comparative morphology of various dicotyledonous families. Carefully preserved material of *Austrobaileya* collected by Mr. L. J. Brass and Mr. S. E. Stephens in Queensland enabled Professor Bailey and Dr. Swamy to make a thorough study of this phylogenetically significant genus. Its secondary phloem is remarkable in being composed of sieve cells and phloem parenchyma strands, and in having *no companion cells*. Its nodal anatomy is of an unusual type resembling that which occurs in *Trimenia* and *Piptocalyx* of the Monimiaceae. Its summation of vegetative and floral characters indicates that it is closely related to, if not actually a member of this family. Dr. Swamy has found two vesselless representatives of the Chloranthaceae. These plants, together with *Amborella* described earlier in the year, raise the number of surviving primitive, vesselless, dicotyledonous genera to ten in five families. It is evident that considerable floral diversification in dicotyledons occurred before the evolution of vessels in the xylem.

The Herbarium. — During the past year 11,282 specimens were mounted and added to the herbarium. The organized herbarium now contains 645,770 mounted specimens.

Accessions during the fiscal year numbered 46,111 specimens, of which 15,545 came in exchange, 25,016 through purchase or subsidy, 3429 by gifts, and 2121 in return for identification. Most of this material comes from southeastern Asia and the Pacific area, or more precisely from continental Asia (10,629 specimens), northern Australia (12,295 specimens), and Polynesia, Micronesia, and Malaysia (10,708 specimens). It very greatly enriches the superb facilities for botanical research on the Pacific and Asiatic floras already available at the Arboretum. Among the more

important individual accessions are the 11,928 specimens from northern Australia made by L. J. Brass on the 1948 Richard Archbold Expedition to Cape York; 2233 plants of Hosokawa collections in Micronesia received through Dr. H. L. Li from the National Taiwan University; 1338 photographs of types and other critical specimens in Formosan herbaria obtained through the courtesy of Prof. Ying Tsiang; 1200 of Mrs. Clemens' collections from Papua received from the Botanical Museum, Berlin-Dahlem; 1447 chiefly classic Malaysian collections received from the Rijksherbarium, Leiden, and 2115 photographs of South American types received from the Chicago Museum of Natural History. Some other important accessions are 2784 Polynesian plants from the Bernice P. Bishop Museum, Honolulu; 2985 plants of Yunnan from the Fan Memorial Institute, Peiping; and 650 plants of Szechuan from the University of Chengtu, Szechuan.

A total of 30,591 specimens were sent out from the herbarium during the year, of which nearly half (6684 mounted and 6992 unmounted specimens) consisted of American tropical material transferred to the Gray Herbarium. In exchange, 2892 specimens were sent to American and 6932 to foreign institutions.

The Arboretum received thirty-five requests for the loan of its herbarium material. Of these twenty-six came from a total of 14 American institutions and nine from six foreign botanical establishments. A total of 7031 specimens was involved. For the use of the Arboretum staff 6776 specimens were borrowed from other institutions, constituting seventeen loans from seven American and twelve loans from seven foreign institutions.

Professor Rehder completed the proof reading for his monumental "Bibliography of Cultivated Trees and Shrubs," which was finally printed and issued in the closing fortnight of the fiscal year. The work represents about ten years of bibliographic research and will long remain an indispensable tool in horticultural and herbarium taxonomy.

Dr. Merrill completed the final proof reading of his definitive catalogue of the botanical work of Rafinesque. With his work on this large project finished, he turned to herbarium studies, and especially to the organization and identification of large collections recently received from the Philippines. Dr. Johnston worked on West Indian and Central American Boraginaceae and prepared an account of the family for the "Flora of Trinidad and Tobago." Dr. Kobuski has progressed in his studies of the Theaceae despite very heavy editorial duties. Dr. Perry has organized the very large collections made by Brass on Cape York and now has readied for distribution many of the named duplicates now on hand from New Guinea.

Overshadowing in importance all other activities of the herbarium staff has been the formulation of final plans for the new building in Cambridge which is to house the combined herbaria and libraries of the Arnold Arboretum and the Gray Herbarium. Dr. Johnston, Dr. Kobuski, and Mrs. Schwarten have been particularly active in this project. Their

routine work has tended more and more to be directed towards readying the herbarium and library for the anticipated move to Cambridge.

Two members of the herbarium staff resigned during the fiscal year. Dr. Allen left in August 1948 because of illness in her family. Dr. Smith terminated his appointment in September to assume a curatorial post at the U. S. National Museum.

The Library. — During the fiscal year ended June 30, 1949, 267 bound volumes were added to the library, bringing the total up to 47,033; 207 pamphlets were catalogued and filed, bringing that total to 14,355. Five hundred and thirty catalogue cards were added to the main catalogue; 4,885 to the Gray Herbarium new species cards. A shelf list was made for the monograph section of the library.

The monographs have been reclassified and rearranged according to the Dalla Torre & Harms system, thus enabling taxonomists to find the necessary work filed under the same number as the herbarium specimen is filed in the herbarium.

A high school student has worked in the library after school hours and on Saturdays, dusting the books and shelves with a vacuum cleaner. Minor book repairs were made at this time; major ones going to the bindery (some seventy volumes were restored or repaired by the binder).

The photograph collection has been enriched by about 275 pictures taken in the Arnold Arboretum by the Horticulturist and his assistant.

Inter-library loans have been about the same as in previous years; numerous requests for typed descriptions, microfilms and photostats, as well as prints from our collection of Microfilms of war-lost German periodicals.

Financial report. — The Arnold Arboretum received during the year \$3,333.33 from the Georgiana Wells Sargent bequest, \$63,198.45 from the Louisa W. Case estate, and \$1,379.78 from the Marian R. Case estate. These funds were added to endowment. Gifts for current use included \$8,969.00 from the Friends of the Arnold Arboretum, \$340.00 for the Rafinesque Publication Fund, \$2,000.00 for the Chinese Exploration Fund, and \$100.00 for special travel funds.

The total income for the year was \$179,328.41 and total expenditures were \$193,897.28. The apparent deficit was due to the fact that special grants for horticulture and publications built up in former years were drawn on heavily during the past year.